



(RESEARCH ARTICLE)



## Quality of medical care and patient safety, and clinical simulation: A goal for faculty at the faculty of medicine, BUAP

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### Abstract

The medical training involving theoretical and practical complexity requires settings that contribute to patient safety. It emerged with the evolution and complexity of healthcare systems, resulting in an increase in patient harm within healthcare facilities. The main objective is to prevent and reduce risks, errors, and damages experienced by patients during medical care. The cornerstone of this discipline is continuous improvement, based on learning from mistakes and adverse events.

The aim of this study is to analyze the significance of healthcare quality and patient safety, along with clinical simulation in medical education, through a literature review, from the perspective of developing professional competencies.

**Materials and Methods:** Through a review of scientific literature in databases, websites, scientific journals, books, and others, the selection criteria encompassed articles in Spanish from the last 5 years related to the topics of healthcare quality, patient safety, and analysis of clinical simulation within the Faculty of Medicine at BUAP.

**Results:** It was evident that the quality of healthcare and patient safety during healthcare delivery is directly influenced by the quality of education students receive in universities. There's a consensus that clinical simulation contributes to better professional training, serving as an innovative teaching strategy that enables the enhancement of students' and professionals' skills and abilities. The Faculty of Medicine at BUAP includes the subject of healthcare quality and patient safety, as well as clinical simulation, in its curriculum at various levels, which has piqued significant interest among instructors for its implementation. Moreover, the institution is in the process of expanding its clinical simulation hospital, which aims to contribute to significant knowledge.

**Conclusion:** Healthcare quality, patient safety, and clinical simulation play a pivotal role as teaching methods in medical education, significantly contributing to student and physician learning. This orientation toward safe medical practice ultimately impacts the enhancement of patient healthcare. These elements are already partially implemented within BUAP's Faculty of Medicine.

**Keywords:** Healthcare Quality; Simulation; Medical Education

### 1. Introduction

Patient safety is a global public health concern, as it not only impacts people's health but also leads to significant economic losses. To ensure proper quality of care and patient safety, new educational models are necessary. This requires a paradigm shift to strengthen knowledge through medical practice. Simulation in Medicine arises as a pedagogical necessity (1).

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Clinical skills are constantly evolving, involving a combination of processes, techniques, and human interaction. These aspects in healthcare make it a delicate field, demanding a significant commitment to society, with clinical and socio-economic effects (2).

Given the complexity of medical training, scenarios that contribute to patient safety are essential. This healthcare discipline emerged with the evolution of healthcare systems, leading to an increase in patient harm within healthcare facilities. Its goal is to prevent and reduce risks, errors, and damages suffered by patients during healthcare delivery. Continuous improvement, based on learning from errors and adverse events, is fundamental.

Patient safety is crucial for providing essential, quality healthcare services. There is a consensus that quality healthcare services worldwide must be effective, safe, and patient-centered. To effectively benefit from quality healthcare, services must be timely, equitable, integrated, and efficient. Successful implementation of patient safety strategies requires clear policies, leadership, data-driven improvements, qualified healthcare professionals, and effective patient participation in their care. Clinical simulation, as an innovative educational method, is used in medical education to simulate real-world scenarios and enhance learning and patient safety (3).

Simulation in medical education has shown significant development globally, becoming a teaching and learning tool that fosters competency development, particularly in acquiring clinical skills before actual patient contact. It promotes patient safety by acquiring skills to reduce the likelihood of errors or complications in healthcare delivery. It plays a significant role worldwide, facilitating the acquisition of clinical skills and enhancing patient safety (4).

Patient safety is a fundamental component of universal health coverage. Providing safe and high-quality healthcare services is a prerequisite for strengthening healthcare systems and achieving effective Universal Health Coverage (UHC), a component of Sustainable Development Goal (SDG) 3: "Ensure healthy lives and promote well-being for all at all ages" (5).

SDG 3.8 focuses on achieving UHC, including protection against financial risks and access for all to essential quality health services, safe, effective, affordable, and quality essential medicines and vaccines. To achieve this goal, the WHO promotes the concept of effective coverage, considering UHC as a means to achieve better health and ensure patients receive quality services in safe conditions (6).

Simulation-based medical education has proven its utility in the teaching and learning process, shaping healthcare professionals with knowledge and skills to be applied safely. It offers students a more realistic view of professional practice (7).

The demand for innovative educational technologies in healthcare professional training stems from the need to ensure patient safety and to consider it a key component in educational curricula. Well-designed training programs promoting competency improvement and appropriate behaviors achieve this goal. Clinical simulation serves as a tool to achieve medical skills and repetitive practice, training for uncommon situations. It allows errors to be explored thoroughly without real consequences, fostering objective reflection during or after mistakes (2).

Demonstrating the effectiveness of simulation is central to healthcare quality and safety. However, simulation should not replace supervised real-world practice but should complement it for safe and effective practice (1).

For effective simulation, realistic and secure scenarios are crucial. Simulation can also aid in acquiring other competencies, such as effective communication among peers, doctor-patient interactions, and interdisciplinary teamwork, all of which contribute to patient safety. The present trend is to use simulation to emphasize patient safety, training future doctors to solve various clinical cases. In medical practice, after the patient, the physician is often the second victim of a failure or error. Simulation provides a unique opportunity for healthcare professionals to train in a safe environment, discussing complex clinical cases and procedures with their peers. Simulation promotes teamwork, improves complex system performance, and, most importantly, nurtures a patient safety culture (2).

Therefore, BUAP's Faculty of Medicine aims to promote a patient-centered culture, developing competencies in students to recognize unsafe conditions, systematically report incidents, and investigate and deepen their understanding of human skills. In teaching practice, simulation is considered a tool capable of overcoming the limitations of traditional pedagogical methods (7).

Currently, society's demands to cultivate a culture of quality in medical care and patient safety have spurred the introduction of clinical simulation as an innovative teaching strategy for enhanced professional education in global Medical education (3)

Hence, clinical simulation, as an innovative educational method, has allowed for the integration of a new element in medical education that contributes to patient safety, in line with the care quality guidelines established by the "World Alliance for Patient Safety," created in 2004 by the World Health Organization (WHO). These guidelines include strategies for healthcare personnel training and education that appropriately address the needs for quality care and patient safety (8,9).

The alliance's program encompasses a set of key measures aimed at reducing the number of illnesses, injuries, and fatalities suffered by patients receiving healthcare. Its goal can be summed up in the motto "first, do no harm." Safety stands as the cornerstone of clinical care quality, and its success requires individual and collective commitment (10).

Likewise, the International Medical Association encourages healthcare professionals to recognize safety as a primary element necessary for improving clinical care quality. Clinical simulation places the trainee professional (student) in a context where a reality they might encounter in clinical practice is replicated. Through this dynamic, students are encouraged to make decisions and choose procedures they must follow, provided they have mastered technical aspects such as knowledge of health and disease processes and intervention techniques (11,12).

Consequently, simulation is considered an inventive approach within medical education, allowing students to safely and controlledly engage in practices that align with their professional requirements. It places them in an environment simulating reality, providing tools for solving different pathologies prevalent in our population (13).

### **1.1. WHO's Burden of Harm**

Each year, millions of patients suffer injuries or die due to unsafe and poor-quality healthcare. Many medical practices and healthcare-associated risks are becoming significant patient safety issues and contribute significantly to the burden of harm caused by unsafe care. These include:

Medication errors are one of the leading causes of preventable injuries and harm within healthcare systems. Globally, the cost associated with medication errors is estimated at \$42 billion annually (14).

Healthcare-associated infections affect 7 to 10 out of every 100 hospitalized patients in high-income and middle-income countries, respectively (15).

Unsafe surgical procedures lead to complications in up to 25% of patients. Annually, nearly seven million surgical patients experience significant complications, with one million dying during or immediately after the procedure (12).

Unsafe injection practices in healthcare settings can transmit infections, including HIV and hepatitis B and C viruses, posing a direct danger to patients and healthcare professionals. This represents a burden of harm estimated at 9.2 million years of life lost due to disability and death worldwide (5).

Diagnostic errors affect approximately 5% of adults receiving outpatient care, and over half of these errors can lead to severe harm. The majority of individuals experience a diagnostic error at some point in their lives (13).

### **1.2. Unsafe Transfusion Practices**

Unsafe transfusion practices expose patients to the risk of adverse transfusion reactions and infection transmission. Data on adverse transfusion reactions from a group of 21 countries show an average incidence of 8.7 severe reactions per 100,000 units of blood components distributed (15).

### **1.3. Irradiation Errors**

Irradiation errors encompass cases of overexposure to radiation and instances where the wrong patient or area is irradiated. According to a review of safety data in radiation therapy spanning 30 years, the overall incidence of errors is estimated at around 15 per 10,000 treatment cycles. (16, 17).

#### 1.4. Delayed Diagnosis of Sepsis

Sepsis often goes undiagnosed in time to save the patient's life. As many of the infections causing sepsis are antibiotic-resistant, they can lead to rapid clinical deterioration. It is estimated that annually, 31 million people worldwide are affected, with over 5 million deaths resulting from sepsis (18).

#### 1.5. Venous Thromboembolisms

Venous thromboembolisms are among the most frequent and preventable causes of harm to patients, accounting for a third of complications attributed to hospitalization. Annually, an estimated 3.9 million cases are recorded in high-income countries, with 6 million cases in low- and middle-income countries (19).

#### 1.6. Adverse Events in Hospitals

In the UK, it's known that one in ten patients experiences an adverse event while in hospitals, with a similar figure reported in countries like New Zealand and Canada. The total national cost of preventable adverse medical events in the US ranges between \$17 billion and \$29 billion annually. In the UK, it amounts to £5.8 billion, due to increased hospital stay, additional diagnostic studies, indemnity payments, and disabilities, among other factors (1).

#### 1.7. Patient Safety Initiatives in Mexico

In Mexico, there is no current information on the actual economic impact in the healthcare domain. However, it is known that medical errors can result in economic losses in various aspects for institutions, healthcare providers, patients, and their families. In response to these issues, the World Health Organization (WHO) launched the World Alliance for Patient Safety in 2004. It has generated policies to mitigate both patient health and economic impacts within global healthcare systems. Three concrete actions have been underway since 2005:

Raising awareness within the healthcare system about the significance of nosocomial infections for patient safety and promoting prevention strategies in countries.

Strengthening the commitment of countries to prioritize the reduction of nosocomial infections.

Testing the implementation of WHO guidelines on hand hygiene in the practice (safe clinical procedures), equipment (injection and immunization safety), and environment (clean water and sanitation in healthcare) (2).

In 2009, WHO published a Curriculum Guide for medical schools to introduce and promote patient safety education. This guide contains 11 points to be integrated into the curriculum of medical schools through teaching strategies aimed at enhancing an understanding of patient safety (Table 1).

**Table 1** Topics recommended by the WHO for patient

	<b>Topics recommended by the WHO for patient</b>
1	What is patient safety?
2	What are human factors and why are they important for patient safety?
3	Understanding Systems and the Impact of Complexity on Patient Care
4	Effective teamwork
5	Understand mistakes and learn from them
6	Understanding clinical risk and its management
7	Introduction to Quality improvement methods
8	Commitment to patients and caregivers
9	Minimize conditions by improving their control
10	Patient safety and invasive procedures
11	Improve medication safety

The goal for medical school educators is to explore the incorporation of patient safety elements into existing teaching and learning activities (12,13).

Aligned with the principles of effective teaching, opportunities should be maximized to facilitate "active learning," where students engage with the learning process in a meaningful way, rather than being passive recipients of information. Active learning can be encapsulated in the following statement: "Don't tell students what they can discover for themselves, and don't discover for them that they can do themselves " (19).

Based on the above, we proceed to inquire: Is Quality Medical Care, Patient Safety, and Clinical Simulation a Teaching Goal at the Faculty of Medicine BUAP?

### *General Objective*

To determine whether Quality Medical Care, Patient Safety, and Clinical Simulation are teaching goals at the Faculty of Medicine (FACMED), BUAP.

### *Specific Objectives*

Identify Quality Medical Care and Patient Safety in clinical simulation within Medical Education and their trends at FACMED, BUAP.

Identify clinical simulation as an innovative teaching strategy in medical education that contributes to promoting quality care and patient safety.

Analyze the importance of integrating clinical simulation as an active teaching method in the medical curriculum.

Establish clinical simulation as a complementary method in the teaching and learning process of the Medical Career at FACMED, BUAP, aiming to enhance professional training and patient safety.

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## **2. Materials and Methods**

This is an analytical, observational, cross-sectional, retrospective, retrolective study. By utilizing keywords such as "Quality Medical Care," "Patient Safety," and "Simulation in Medical Education," a systematic search of scientific literature published in Spanish and English was conducted across databases like Medline, SciELO, Google Scholar, university repositories, and books. Additionally, various bibliographies of relevant Spanish articles and theses from recent years were reviewed.

Titles and abstracts of documents, projects, and original articles were examined. Collected information was then classified and organized based on main topics, subtopics, chronology, and work structure. Subsequently, an interpretative reading and critical analysis were undertaken to arrange and synthesize the information on Quality Medical Care, Patient Safety, and Clinical Simulation used in the teaching and learning process of medical education. Advancements related to the evolution of simulators and simulation scenarios in clinical-surgical competence were also studied. This was accomplished through surveys of academic institutions and a literature review, considering the perspective of professional competence development and patient safety. Furthermore, the current scenario at FACMED BUAP was examined, utilizing evidence material from the Skills and Abilities Hospital of the Faculty of Medicine.

Various figures and graphics were used to present the reviewed material, including the layout of the University Hospital of BUAP (Figure 1), the inclusion of quality medical care and patient safety in the curriculum map (Figure 2), and the determination of the number of subjects utilizing simulation-based teaching and learning (Figure 3,4 ).

Ethics: The study was evaluated by the ethics committee of postgraduate studies at the Faculty of Medicine, BUAP.



**Figure 1** From the Skills and Abilities Hospital (HHYD) at the Faculty of Medicine BUAP



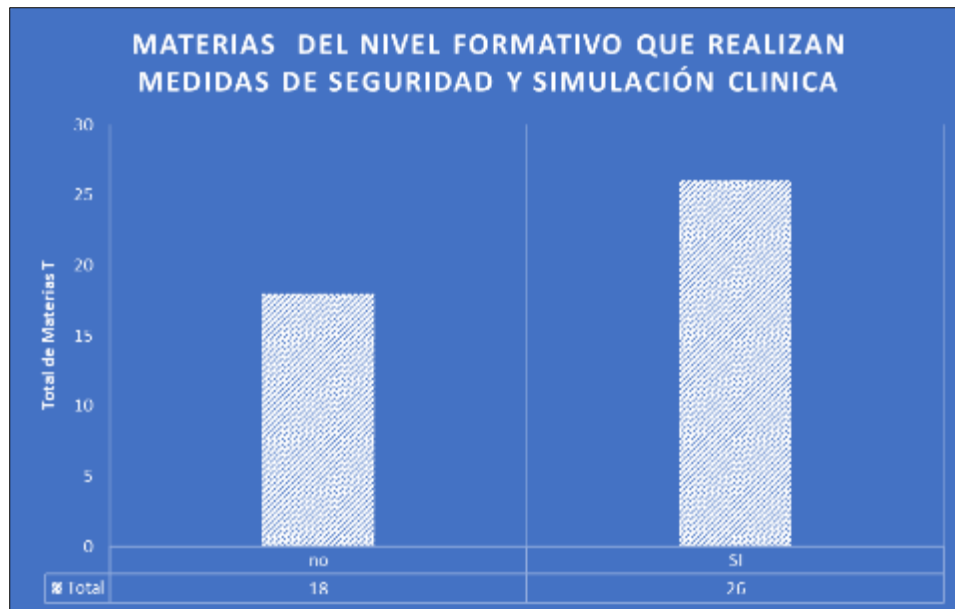
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**Figure 2** From the University Hospital of BUAP



Figure 3 Curricular map of the Degree of Medicine





**Figure 4** Subjects in the Curriculum Map of FACMED BUAP That Use Quality Medical Care and Patient Safety in the Simulation Process

### 3. Results

The analysis conducted demonstrates a universal trend in medical education today, which involves incorporating clinical simulation into the curriculum of medical and other health science programs. This trend arises from multiple studies confirming its validity and utility as a didactic strategy for fostering various competencies in undergraduate and postgraduate students. (1-5, 18, 19).

Specialized bibliographic references show that simulated experience in medical education contributes to the development of professional competencies. It provides students with a more realistic view of medical practice, thereby ensuring patient safety prior to their actual medical practice (1, 18, 19). Patient safety during healthcare provision is directly influenced by the quality of education received by students in universities. Almost all the reviewed documents conclude that simulation contributes to patient safety. This methodology enhances the skills and abilities of both students and professionals graduating from healthcare programs (1-5).

In the field of Medicine, there are social, cultural, religious, legal, and bioethical barriers that, to varying degrees, hinder clinical medical students from acquiring sufficient experience if the premise is to have direct patient interaction. This barrier can be overcome through teaching via simulators and, at a more complex level of the teaching-learning process, through the discussion of clinical cases. These cases draw from the history of real or simulated patients provided by the instructor to achieve very specific objectives (1, 2, 19).

### 4. Discussion

This study has explored the role of Quality Medical Care, Patient Safety, and Clinical Simulation in improving the quality of medical education. The obtained results support the notion that simulation is an effective tool for enhancing the quality of healthcare and ensuring patient safety. Clinical simulation serves as a teaching and learning method that promotes the development of clinical competencies and the acquisition of skills before real patient contact. This implies that students have the opportunity to practice and refine their skills in a safe and controlled environment, thereby reducing the likelihood of errors or jeopardizing patient safety. This, in turn, promotes continuous improvement in the quality of medical education.

By providing students with a more realistic view of professional practice, simulation enables them to face complex clinical situations and develop the necessary skills to deliver high-quality care. Additionally, it fosters teamwork and effective communication among healthcare professionals, contributing to more integrated and coordinated care. Clinical simulation in healthcare professional education has implications for competencies that are essential for patient safety



and the prevention of adverse events. Through practice in simulated scenarios, students can identify and address unsafe conditions, appropriately recognize and respond to emergency situations, and acquire effective communication skills.

We identified that several subjects within the curriculum of the Medical Degree Program at FACMED BUAP use clinical simulation at the educational level and also include the subject of Quality Medical Care and Patient Safety. However, some subjects require the implementation of these methodologies in their programs to achieve the development of competencies for the aspiring medical professionals. The integration of clinical simulation and patient safety education across the curriculum enhances the students' ability to provide safe, effective, and high-quality patient care. This aligns with the global trend of using simulation to bridge the gap between theoretical knowledge and practical application in healthcare education.

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## 5. Conclusion

The integration of Quality Medical Care, Patient Safety, and Clinical Simulation into medical education is an achievable goal for the Faculty of Medicine (FACMED) at BUAP. This can be realized through the widespread implementation of simulation processes to enhance the development of professional competencies among students, providing them with clinical skills and fundamental knowledge before they encounter real-life situations. This approach effectively reduces risks and errors in medical care across all educational levels, reinforcing faculty training in these disciplines to enhance the current scenario at FACMED BUAP. The upcoming simulation hospital project by the institution holds the potential to achieve these objectives.

Identifying clinical simulation as an innovative teaching strategy in medical education that contributes to enhancing the quality of care and patient safety is of vital importance. Recognizing its role as an active teaching method within the medical curriculum is crucial for improving both professional training and patient safety.

It's important to acknowledge that clinical simulation should complement real clinical experience rather than completely replacing it. The combination of simulation and supervised practice in real settings allows students to develop clinical skills comprehensively and apply acquired knowledge in authentic scenarios.

Proposal: It's recommended to provide faculty training on the process of Quality Medical Care, Patient Safety, and Clinical Simulation. Additionally, the expansion and equipping of the Simulation Hospital should be concluded to facilitate the integration of these methodologies into medical education effectively.

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## Compliance with ethical standards

### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

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